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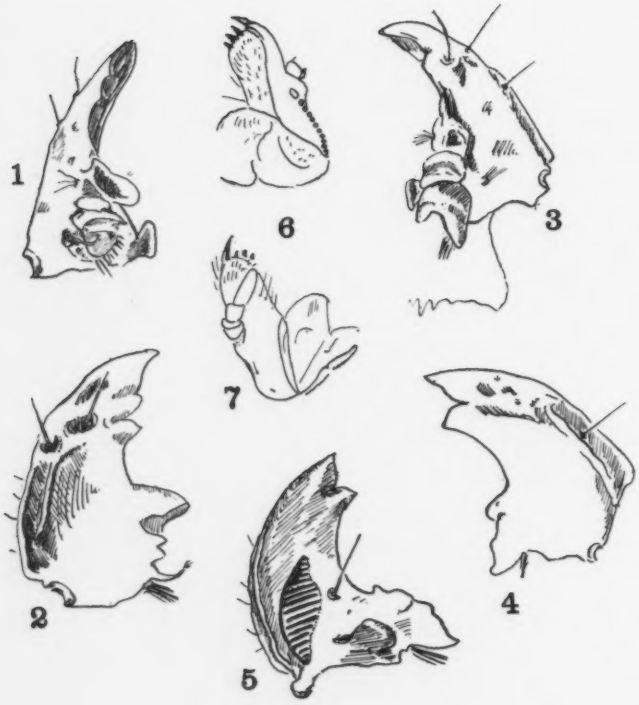

XYLORYCTES SATYRUS FAB.—WEISS.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

THE ACADEMY OF NATURAL SCIENCES, PHILADELPHIA

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Notes on the Larval and Pupal Stages of Xyloryctes satyrus Fab. (Col.: Scarabaeidae).

By HARRY B. WEISS, New Brunswick, New Jersey.

(Plate IV)

Through the kindness of Dr. Alvah Peterson I recently came into the possession of several specimens of the larvae and pupae of the Rhinoceros Beetle (*Xyloryctes satyrus* Fab.), which he had reared and it seemed desirable to describe these stages and to bring together the notes of various authors on the larval habits. Dr. Peterson's material was collected at Urbana, Illinois, in a deciduous woods from soil rich in humus and heavily mulched with leaves. Dr. Adam Böving, Bureau of Entomology, Department of Agriculture, Washington, D. C., has called my attention to J. C. Schiödte's monographic treatment of the Scarabaeid larvae in the Zoological Museum of Copenhagen, Denmark. He also suggested that I prepare my description of the larva of *Xyloryctes* in almost exact conformity with Schiödte's descriptions of Scarabaeid larvae. This suggestion I have been glad to follow. The figures accompanying this paper were made by Dr. Böving.

The adult was described by Fabricius in 1801 (Syst. Eleut. I, 15) from American specimens. Walsh (Proc. Bost. Soc. Nat. His., IX, 287) briefly noted the larva in 1863 and again in 1868 (Am. Ent. I, 60). In 1873 Glover recorded the finding of great numbers of beetles injuring the roots of young ash trees at Babylon, Long Island (Rept. U. S. Dept. Agric., 1873, 152), and noted larvae as having been taken on the roots of liquidambar in Maryland. In *Insect Life* (Vol. III, p. 358) under the heading "General Notes" is a statement to the effect that the adults and larvae were common in the vicinity of Washington, D. C., among grass roots in pastures and deserted fields, and that they were found in the decaying roots of ash trees.

Howard (Bull. 22, n. s. Div. Ent. U. S. Dept. Agric., 1900, p. 105), quoting a correspondent, records *Xyloryctes satyrus* as attacking ash in the vicinity of the University of Virginia and after boring a hole under the surface of the ground to a depth of one or two inches, "seemed to destroy the bark all around the tree." Blatchley (Col. Ind., p. 992) states that it probably occurs sparingly over the southern two-thirds of Indiana, June 3 to September 8, the adults being found in the vicinity of ash trees. In the U. S. Department of Agriculture *Yearbook for* 1906, p. 516, lilac bushes at Stony Brook, New York, were reported as being badly damaged by this scarabaeid. Smith (Ins. N. J., p. 321) records it from Ft. Lee and Newark and throughout South Jersey, July, never common, larva in roots of ash. In *Insects of Quebec* (Part III, Col., p. 229) Chagnon records it from Rouville County in May.

Xyloryctes satyrus Fabricius belongs to the Scarabaeid tribe Dynastini. I. C. Schiödte in his conspectus systematicus of the larvae of the series Lamellicornia has characterized the larvae of this tribe,* and his statement, translated (from Latin) and in a few places slightly modified, may be presented as follows:

CHARACTERIZATION OF THE TRIBE DYNASTINI.

I. Stridulating instrument formed by a dentate carina on the dorsal side of the maxillary stipes, rubbing against a file-like area on the

*I. C. Schiödte: De metamorphosi Eleutheratorum observationes; Naturhistorisk Tidsskrift, series 3, vol. 9, 1874, pp. 227-376, pl. xi-xix.

ventral side of the mandible. Antenna consisting of four joints. Legs all well developed, gradually increasing in length from first to third pair. Anterior abdominal segments dorsally with three transverse areas. Maxillary palp four-jointed (Schiödte says: "three jointed," interpreting the basal joint as palpiger). No (or one) ocellus [*Xyloryctes* evidently has a single ocellus laterally at the base of the antennal ring; this being a very exceptional development among the Scarabaeids]. Mandible with manducatorial portion (= the portion with the molar or grinding structures) profoundly separated from the scissorial portion (= portion with the cutting edge); molar structure with posterior heel bearing a tuft of bristles.

(By the given combination of characters the Trogini, Geotrupini, Lucanini and Passalini—sensu Schiödte—are excluded.)

A. Respiratory plate of spiracles surrounds the major part of bulla. Legs covered with long hair.

(By these two characters the Copridini—sensu Schiödte—are excluded.)

1. Maxilla with both malae [= inner and outer lobes] completely fused. Anal opening transverse and terminal.

(By these characters the Sericini—sensu Schiödte—are excluded.)

a. Scissorial portion of mandible fornicate. Labrum with lateral margins of ventral side smooth. Length of antenna shorter than length of head; subapical antennal joint distally truncate. Stridulating area of mandible partly placed in manducatorial portion; oblong, transversally costate, with well developed distant ridges.

(By these characters the Rutelini and Melolonthini—sensu Schiödte—are excluded.)

Labrum with anterior margin broadly rounded. Claws slender, subulate. First six abdominal segments dorsally plicate with setae-bearing tubercles densely set. Tenth abdominal segment well defined.

Characterization of Subdivisions and Genera of Dynastini.

The forms described by Schiödte as typical Dynastine larvae, on which his characterization of this tribe is based, are: *Xylotrypes gideon* Linnaeus from Malayan Archipelago, *Oryctes nasicornis* Linnaeus from Denmark, and *Parastacia confluens* Westwood from the Nicobar Islands. The first two larvae represent one taxonomic subdivision of the Dynastini, *Parastacia* another. The present larva of *Xyloryctes satyrus* Fabricius belongs to the first subdivision which Schiödte characterizes as follows:

First Dynastine Subdivision.

Inner mala of maxilla (= lacinia) tridentate. Pars scissoria of mandible dentate [Schiödte has "tridentate," but as *Xyloryctes* has only

two teeth on the right mandible and the second tooth on the left mandible is small; third tooth large, and as the second Dynastine subdivision is characterized as having mandibles without teeth, .the original term "tridentate" is here changed to the more correct term "dentate"]. Stridulatory teeth of maxilla short, compressed, truncate. Tibia half as long as femur. Claws of third pair of legs shorter than the other claws. [1]

The two genera of the first Dynastine subdivision are defined by Schiödte as follows:

Xylotrypes.

Frons one-third broader than long, with posterior frontal angle acuminate. Labrum transverse quadrate. Mandible shorter than head. Pars scissoria with three teeth; posterior tooth of right mandible minute, of left mandible strong. Stridulatory teeth of maxilla six, very coarse. Maxillary palp not reaching apex of exterior mala.

Oryctes.

Frons twice as broad as long, with posterior frontal angle subrectangular. Labrum transversally orbiculate. Mandible as long as head. Pars scissoria with three teeth; posterior tooth of both mandibles minute. Stridulatory teeth of maxilla ten. Maxillary palp extending beyond apex of mala.

Xyloryctes.

(The following definition of *Xyloryctes* is given in exact conformity with Schiödte's formula.)

Frons twice as broad as long, with posterior frontal angle subrectangular. Labrum transversally orbiculate. Mandible shorter than head. Pars scissoria of right mandible with two teeth, of left mandible with three teeth; posterior tooth strong. Stridulatory teeth of maxilla ten. Maxillary palp not reaching apex of exterior mala.

Xyloryctes differs both from *Xylotrypes* and *Oryctes* by the shape of the mandibles. It seems more closely allied to *Oryctes* than to *Xylotrypes,* even though it has the two characters: "Mandible shorter than head and maxillary palp not reaching apex of exterior mala" common with *Xylotrypes.*

Xyloryctes satyrus Fab.

Length of mature larva about 50 mm. Extreme width of head about 7.5 mm.

Frons coarsely punctate, twice as broad as long, with posterior frontal angle subrectangular.

Epicranial and frontal sutures faint. Epicranial suture about one-third the length of the frons. Procephalic lobes coarsely punctate.

Clypeus coarsely punctate, subrectangular, about three times as wide as long.

Labrum transversally orbiculate, coarsely punctate, bearing a few setae on dorsal surface, anterior edge fringed with setae, lateral edges each bearing a row of minute setae.

Antennae shorter than length of head, four-jointed, second joint slightly longer than the first; first, third and apical joints subequal in length, each joint except apical one more or less enlarged distally, apical joint bluntly pointed.

Ocelli lateral, one at base of each antennal ring.

Maxillary lobes (lacinia and galea) fused into a single, fleshy, setose structure; exterior lobe (galea) with a single, terminal curved, prominent tooth (uncus), around which are several strong setae; interior lobe (lacinia) with three strong, conical teeth and numerous stiff setae. Stridulatory teeth of maxilla ten.

Maxillary palp not reaching apex of exterior mala, four-jointed, basal joint short, second joint twice as long as basal one, second and subapical joints equal in length, subapical joint bearing two setae, apical joint slightly longer than subapical.

Lingua fleshy, cushioned, densely set with spines.

Mandible: Scissorial portion same length as manducatorial portion and almost as wide; above and below with deep, unequal rugosities and shallow depressions; dorsal surface convex with three large depressions; two setae; ventral surface vaulted; cutting edge thin, terminally very acute; right mandible with two teeth, left mandible with three. Lateral exterior mandibular portion heavily rugose, limited by two longitudinal margins, which posteriorly, between scissorial portion and basis of mandible, are carinate; one or two setae. Stridulating area oval, with rather coarse ridges; that of right and left mandible almost of the same size. Manducatorial portion of right mandible with molar part oblique, anteriorly low, posteriorly prominently projecting, sloping gradually downwards from the upper part of the crown to the heel. Crown with two transverse, obtusely carinate lobes, anterior to which is a round depression framed by a thick and low elevation. Heel large, transverse, subtrapezoidal, grinding surface flat, anteriorly with transverse low elevation, posteriorly deeply emarginate with ventro-posterior angle pointed, tooth-like, about as long as wide and with dorso-posterior angle developed into a broad, long, rather obtuse process, about three times as long as wide, extending over and completely covering bristle-bearing base. Left molar part anteriorly prominent, posteriorly retracted, crown trilobed; upper lobe strong, large, anteriorly with margin projecting and acute, and with grinding surface excavate; median and posterior lobes much smaller, each carrying an obtuse, transverse carina, which dorsally projects into a sharp tooth; ventrally the two lobes fuse, terminating with a small round elevation. Heel suborbiculate, anteriorly limited by a low transverse carina coming from a slender, pointed, dorsal piliferous hook and disappearing towards the ventral

elevation of the preceding lobes; bristle-bearing base posteriorly with obtusely conical, approximately semicircular outline and anteriorly almost contiguous with grinding surface of heel.

Body form clavate cylindrical, between four and five times as long as thick. Dorsal areas of second to sixth abdominal segments bearing several long hairs and numerous minute, stiff setae arranged transversely.

Legs slender, slightly increasing in length from first to third pair, bearing numerous long and short hairs. Claws slightly incurved, about one-third as long as tibiae.

Color: Head dark mahogany, body white to sordid white. Legs flavo-testaceous. Protergum with brown, transverse, lateral foveolae.

Body areas: Prothorax with one dorsal area. Meso- and metathorax with three dorsal areas, prescutum, scutum and scutellum. First abdominal segment with two dorsal areas, prescutum not being developed, and with the spiracle-bearing alar area dorsally developed into a simple triangular prolongation. The following second to sixth abdominal segments with three dorsal areas, prescutum, scutum and scutellum, and, with the spiracle-bearing alar area dorsally split into two prolongations, the anterior of which being adjacent to prescutum. Seventh to ninth abdominal segments with more or less indistinctly marked or completely fused dorsal areas. Tenth abdominal segment about twice as long as head from tip of labrum to occipital foramen, obtusely conical, well separated from ninth segment which is somewhat larger than the tenth; below with numerous, well developed straight setae, promiscuously scattered, medianly not arranged in special rows. Anal slit transverse, terminal; upper anal lips not sharply defined; lower anal lips posteriorly limited by a straight, transverse impression between the ends of the slit. Spiracles orbiculate, eighth abdominal spiracle half as large as the others; area respiratoria almost completely surrounding bulla; bulla with width about one-fifth of the dorso-ventral length of the entire spiracle. Holes of respiratory plate very small, round, numerous and irregularly set.

Pupa. Length 2.5 to 3.5 cm. Width about 1.7 cm. Chestnut-colored (alcoholic specimens), smooth. Thorax and first two abdominal segments subequal in width, remaining abdominal segments gradually tapering to tip. Anterior portion of prothorax of male bent down almost perpendicularly and bearing two median, longitudinal, parallel, broad, shallow depressions. Head of male with prominent, anteriorly projecting horn. Anterior portion of prothorax of female sloping. Head of female bearing a tubercle. Wing cases faintly, longitudinally striate, striae few. Ninth abdominal segment triangular, tip clothed with velvety pubescence.

PLATE IV. XYLORYCTES SATYRUS FAB.

Fig. 1, Left mandible. Fig. 4, Right mandible, dorsal view.
Fig. 2, Left mandible, dorsal view. Fig. 5, Right mandible, ventral view.
Fig. 3, Right mandible. Fig. 6, Maxilla, dorsal view.
Fig. 7, Maxilla, ventral view.

An Appeal from Russian Fellow-Entomologists and a List of Russian Entomologists Recently Deceased.

Before the Great War one of the most flourishing and promising entomological societies in the world was established in Russia, numbering among its members great names in the entomological world, such as Adelung, Alferaki, Bianki, Oshanin, Nicolas Mikailovitch Romanoff and Cholodkovsky. Little reached our ears during the war about these colleagues, cut off from us by circumstances, and today we are no better informed of their work or well-being. Through the efforts of B. Uvarov, now connected with the Imperial Bureau of Entomology in London, we are able to give some information concerning certain of our Russian friends, sad though it is, consisting of the dates of death of nineteen of them. At the end of this appeal we are giving a copy of this list of names and dates, our last sad tribute to some of the leading men of our science. In a forthcoming number of the NEWS we will give biographical notices of the life and work of several of the deceased.

In spite of the fact that Russian entomology has lost about fifty of its devotees, including some of its really great, those still with us are striving to continue their studies as well as conditions will permit. Their main handicap is the lack of literature, as virtually everything published since 1915 never reached Russia. With exchange in its present state the purchase of publications is impossible for them, and they appeal to all American entomological societies to send sets of journals and single papers published since 1915, also authors to send separates of their papers which have appeared since the same date.

All books, journals, etc., may be sent to Mr. G. Jacobson, Secretary of the Russian Entomological Society, Zoological Museum of the Academy of Sciences, Petrograd, Russia. Through the Russian Society distributions can be made as far as possible to the students in Petrograd and adjacent Russia. Kuznetsov, Mordwilko and A. Semenov-Tian-Shanski are at present on the staff of the Zoological Museum, and they earnestly ask for the sending of literature.

We trust our American entomologists will come forward in the spirit which has made the name of America synonymous with charity and unselfishness, and send to our Russian colleagues the needed literature. Without this, as we well know, good constructive study is not possible, so let us help the living Russian fellow students, as well as honoring those who have gone to "the great adventure."

A list of the more prominent Russian entomologists who died in the years 1916 to 1921.

Following each name is the date of death.

N. v. ADELUNG, Keeper of Orthoptera in the Zoological Museum of the Academy of Sciences, Petrograd, November 23, 1917.

S. N. ALFERAKI, Lepidopterist, July 27, 1918.

V. L. BIANKI (Bianchi), Zoological Museum of the Academy of Sciences, Petrograd, January 10, 1920.

E. M. VASSILJEV, Professor of economic entomology, July, 1919.

N. A. ZARUDNY, known for his field studies in Persia and Central Asia, March 13, 1919.

V. A. KARAVAJEV, Specialist on Formicidae, 1919.

A. KRULIKOVSKY, Lepidopterist, October, 1920.

N. V. KURDJUMOV, Economic entomologist, September 7, 1917.

V. T. OSHANIN, Keeper of Rhynchota in the Zoological Museum of the Academy of Sciences, Petrograd, January 26, 1917.

E. V. PYLNOV, Orthopterist, 1920.

V. N. RODZJANKO, Economic entomologist, 1919.

N. M. ROMANOFF (the Grand Duke Nicolas Mikailovitch), Lepidopterist, January 29, 1919.*

A. A. SILANTJEFF, Economic entomologist, March 21, 1918.

D. A. SMIRNOV, Coleopterist: specialty Curculionidae, August 17, 1920.

A. A. SOPOTSKO, Economic entomologist, May 1, 1919.

J. T. SCHREINER, Economic entomologist, July, 1918.

N. A. CHOLODKOVSKY, Professor of general entomology, specialty Aphidodea, April 2, 1921.

TH. STCHERBAKOV, Orthopterist; economic entomologist, September, 1920.

I. SHEVYREV, Chief of the Entomological Laboratory of the Forest Department, July 7, 1920. J. A. G. REHN.

*See Ent. News, vol. xxx, p. 210.

A Key to the Species of the Genus Coenosia Meigen (Dipt., Anthomyiidae).

By J. R. MALLOCH.

The species included in this key fall within the limits of the genus as restricted in several of my recent papers on the family.

Key to species.

1. Legs either entirely yellow or with only a portion of the coxae or tarsi or both blackened.....2
— Legs with at least a portion of one or more pairs of the femora, in addition to the tarsi, blackened.....17
2. Abdomen of male short and broad, segments two and three much narrowed laterally, with a large glossy black patch on apex of former and base of latter on each side; dorsum of abdomen in both sexes with central vitta and paired spots; third antennal segment black; legs usually entirely reddish yellow; anal angle of wing in male usually produced thumblike.....*ovata* Stein
— Abdomen of male not as above, segments two and three not conspicuously narrowed laterally; species not as above in other respects....3
3. Third antennal segment entirely pale yellow.....4
— Third antennal segment largely or entirely black or brown.....10
4. Head including antennae and proboscis yellow; thorax yellow, with or without a grayish or blackish dorsocentral vitta and a similarly colored mark on center of metanotum.....*modesta* Loew
— Thorax largely or entirely black, and usually at least a part of antennae or proboscis black or brown.....5
5. Abdomen unspotted, more or less broadly yellow at base in male and with dense white or pale gray pruinescence; thorax with dense white or pale gray pruinescence, entirely unmarked; antennae short, about two-thirds as long as face.....*nivea* Loew
— Abdomen with paired dorsal spots.....6
6. Antennae entirely yellow; abdomen broadly yellow at base, sometimes entirely yellow, with large, paired dorsal brown spots, fifth sternite yellow, with long slender processes at the base of the inner margins of which there are some black setulae; interfrontalia largely reddish anteriorly; hind tibia with the anterodorsal bristle very strong and of moderate length, the anteroventral one weak, situated much nearer to apex of tibia.....*antennalis* Stein
— Antennae with at least the second segment largely or entirely blackened.....7
7. Anterodorsal and preapical dorsal bristles on hind tibia excessively long and slender, usually three-fourths as long as the tibia; anterodorsal bristle on mid tibia half as long as tibia, the posterodorsal one much shorter.....*longispinosa* Malloch
— Anterodorsal and preapical dorsal bristles on hind tibia not half as long as tibia, or the anterodorsal bristle on mid tibia is shorter than the posterodorsal one.....8

8. Large species, 4.5 to 5 mm. in length; arista with distinct but short hairs; thorax opaque gray, not vittate; base of abdomen narrowly yellow, the dorsum with three pairs of black spots *compressa* Stein
— Smaller species, averaging 2.5 mm. in length; arista almost bare, the pubescence visible only under a high-power lens; abdomen either broadly yellow at base or entirely blackish gray.....9
9. Dorsum of thorax opaque gray, with three poorly defined brown lines, one in center and the others along the line of dorsocentrals; base of abdomen broadly yellow, the dorsum with four pairs of black spots; mid and hind femora each with a short posteroventral bristle; longest bristle on hind tibia not one-fourth as long as tibia, *frisoni* Malloch
— Dorsum of thorax distinctly shining, blackish; base of abdomen not yellow, dorsum with three pairs of black spots; mid and hind femora each with a very long median posteroventral bristle; longest bristle on hind tibia about one-third as long as tibia, *oregonensis* Malloch
— Dorsum of thorax opaque gray, not vittate; abdomen not yellow at base, with two pairs of distinct dorsal spots, one on the third and the other on the fourth tergite; mid and hind femora each with a very fine median posteroventral bristle, the one on hind femur very long; hind tibia with the bristles very slender, the anterodorsal one over half as long as the tibia.....*argenticeps* Malloch
10. Antennae entirely black; mid tibia with an anterodorsal and a posterodorsal bristle 11
— Antennae partly reddish or yellowish; mid tibia with only the posterodorsal bristle 14
11. Scutellum with the apical pair of marginal bristles absent or minute, the basal pair very long and strong; abdomen yellowish brown, without paired dorsal spots.....*dichaeta* Malloch
— Scutellum with two pairs of strong marginal bristles.....12
12. Large species, averaging 5 mm. in length or over; pruinescence of body brownish yellow; tarsi not longer than tibiae; hind femur with some very strong bristles on basal half of posteroventral surface; abdomen without dorsal spots or with a very poorly defined pair on fourth tergite .....*flavifrons* Stein
— Smaller species, not exceeding 3 mm. in length; pruinescence of body either whitish or bluish gray; hind femur without strong bristles on posteroventral surface; abdomen with the dorsal spots fused, so that the surface presents the appearance of having a broad brownish-black dorsal vitta, or a narrowly divided pair of vittae 13
13. Thorax and abdomen with whitish pruinescence; hind femur with very long anteroventral bristles; hind tibia with the anterodorsal and preapical dorsal bristles over half as long as tibia, *setigera* Malloch

— Thorax and abdomen with bluish gray pruinescence; hind femur with short weak anteroventral bristles; hind tibia with the anterodorsal and preapical bristles about one-fourth as long as tibia, *dorsovittata* Malloch

14. Hind tibia with one or two short posterodorsal setulae at middle; propleural bristles very short and stout, the anterior one very conspicuously so; lower stigmatal bristle weak or absent, *laricata* Malloch

— Hind tibia without posterodorsal setulae; propleura with a long, slender bristle and a fine anterior hair.....15

15. Abdomen yellow, at least at base; basal two antennal segments and palpi yellow; thorax densely white pruinescent; antennae but little shorter than face .....*nudiseta* Stein

— Abdomen entirely black; basal two antennal segments and palpi largely or entirely black.....16

16. Larger species, about 5 mm. in length; processes of fifth abdominal sternite much longer than broad, armed with a few long bristles and numerous long hairs; bristles on posteroventral surfaces of mid and hind femora very long and strong, extending from base to apex, but very widely spaced; basal segment of mid and hind tarsi not one-third as long as tibia.....*johnsoni* Malloch

— Smaller species, averaging about 3 mm. in length; processes of fifth sternite but little longer than broad, their surfaces with a few setulose hairs; bristles on posteroventral surfaces of mid and hind femora short and weak, confined to basal half; basal segment of mid and hind tarsi more than one-third as long as tibia, *flavicoxa* Stein

17. Wings very noticeably brownish except at bases; legs very long and slender, gradually darkened from near base of femora apicad, the tibiae and tarsi usually almost entirely black or brownish black; thorax and abdomen densely white pruinescent, without markings.18

— Wings clear; legs not colored as above, either the femora with clearly limited black markings apically or entirely black, or the tibiae are pale, or the entire legs are black except the knees; if the thorax and abdomen are white pruinescent the latter has distinct paired dorsal spots except in *impunctata*.....19

18. Frons but little longer than broad, densely silvery pruinescent; orbits not clearly defined, the bristles except the anterior pair very weak, sometimes absent; basal scutellar bristles very much weaker than apical .....*argentata* Coquillett

— Frons about twice as long as broad, interfrontalia fuscous, orbits well defined, white pruinescent, the bristles strong; basal scutellar bristles not much weaker than apical.....*fuscifrons* Malloch

19. Third antennal segment with a sharp thornlike point on upper side at apex; fore coxae and femora largely infuscated; lower stigmatal

bristle weak, directed ventrad; abdomen without paired dorsal spots; interfrontalia reddish anteriorly.....*denticornis* Malloch

— Third antennal segment more or less angulated at apex but not produced thornlike 20

20. Lower stigmatal bristle very weak, sometimes absent, when present directed upward; fore coxae and femora entirely or almost entirely black 21

— Lower stigmatal bristle directed outward and ventrad, or the legs not colored as above 22

21. Male hypopygium very prominent, fifth dorsal segment very large, globose; fifth sternite with very large, exposed processes, which are arcuately emarginate on lower margins and rounded above, presenting a slightly crescentric shape; mid and hind femora in both sexes usually yellow; basal segment of hind tarsi not one-third as long as their tibiae .....*hypopygialis* Stein

— Hypopygium moderately prominent; fifth dorsal segment subequal in length to basal segment of hypopygium; fifth sternite with large processes which are almost straight on their inner or lower margins; mid and hind femora usually yellow; basal segment of hind tarsus a little over one-third as long as hind tibia,
errans n. n. (*steinii* Johnson nec Verrall)

— Hypopygium very small, hardly protruded, fifth sternite with very short processes; mid and hind femora conspicuously blackened at apices; basal segment of mid and hind tarsi at least one-third as long as their tibiae.....*lata* Walker

22. Fore coxae largely or entirely, mid and hind femora entirely yellow 23

— Fore coxae and all femora largely or entirely black.....25

— Fore coxae yellow, all femora with a black or brownish mark above near apices; abdomen unspotted; antennae and palpi black; thorax and abdomen with pale gray pruinescence.....*impunctata* Malloch

23. Male with a bare glossy black area on each side of abdomen at apex of first segment; abdomen in both sexes with an interrupted central vitta and paired spots on dorsum black.....*ovata* Stein

— Male without a bare glossy area on each side of abdomen; abdomen in both sexes with only paired dorsal spots.....24

24. Antennae short, extending but little below middle of face, upper apical angle of third segment blunt; abdomen in both sexes with very distinct paired dorsal spots.....*flavicoxa* Stein

— Antennae elongate, extending over four-fifths of the distance to mouth-margin, upper apical angle of third segment very acute; abdomen in both sexes with very indistinct paired dorsal spots,
pallipes Stein

25. Hind tibia with two or three median anterodorsal bristles,
aliena Malloch

— Hind tibia with only one anterodorsal bristle.....26

26. Fore tarsi yellow, last segment black; hind tibiae largely black, *nigricoxa* Stein
— Fore tarsi black 27
27. Third antennal segment in male very broad; abdomen in both sexes with an interrupted central vitta and paired spots on dorsum; anterior mid tibial bristle much nearer to apex of tibia than is the posterior one; apex of fourth wing-vein much basad of apex of third ..... *rufitibia* Stein (*tibialis* Stein)
— Third antennal segment of male narrow; abdomen in both sexes with or without paired dorsal spots and without central vitta; anterior bristle on mid tibia almost at same distance from apex as the posterior one; apices of third and fourth veins in vertical line or almost so 28
28. Lower calyptra barely larger than upper; hind tibia with a median posterodorsal bristle; legs black, bases of tibiae narrowly red, *Hoplogaster californiensis* Malloch
— Lower calyptra at least twice as large as upper; hind tibia without median posterodorsal bristle 29
29. Large species, 3.5 to 4.5 mm. in length; tibiae entirely reddish yellow; processes of fifth abdominal sternite of male longer than their basal width ..... *alticola* Malloch
— Smaller species, not over 3.5 mm. in length; tibiae pale at bases... 30
30. Frons grayish pruinescent, the interfrontalia when seen from in front grayish, when seen from behind less distinctly so; processes of fifth abdominal sternite of male not longer than their basal width ..... *fraterna* Malloch
— Frons not grayish pruinescent, the interfrontalia when seen from in front brownish, from behind velvety black.... *anthracina* Malloch

My species *Coenosia cilicauda* belongs to *Macrocoenosia.*

Professor P. Stein has published (1920) a large paper on North American Anthomyiidae in which he has described several species of this genus, but I am unable to locate with certainty any of his valid species except *nigricoxa* in my key. Several of the species he describes as new are synonyms of previously described species. His *argenticolor* is *argentata* Coquillett, *pallida* is evidently *modesta* Loew, and *albibasis* is *nivea* Loew. In his notes under *argenticolor* he mentions a variant which is *fuscifrons* Malloch, and under *pilosissima* Stein he mentions another which is *oregonensis* Malloch. His *pilosissima* is my *longispinosa,* but I have no exact data as to the publication and distribution of his paper, so cannot decide which name will fall. There are one or two other synonyms involved.

Pamphila ottoe Edw. and pawnee Dodge, with Description of a New Form (Lep., Rhop.).

By R. A. LEUSSLER, Omaha, Nebraska.

A study of *ottoe* and *pawnee* has recently been undertaken in an endeavor to classify a form of *Pamphila* met with from time to time at Omaha, Sioux City and elsewhere in this vicinity, which appeared to be neither typical *ottoe* nor typical *pawnee* but partakes of the characteristics of both.

P. *ottoe*, described from a single male, is a very lightly marked form in which the fuscous border of the primaries is faint and very narrow. It is apparently correctly illustrated in Holland's *Butterfly Book*, Pl. 46, figs. 11 and 12.

In *pawnee* the male has broad, well defined, fuscous borders on both primaries and secondaries, with a tendency for the fulvous area to creep out over the dark borders, especially at the apex of the primaries where it resolves itself into distinct spots. On the underside of the secondaries there is almost invariably a row of small light spots. The typical female is quite dark with pale spots on both primaries and secondaries, well defined on upper as well as under surface. Dodge, in his original description, makes definite mention of these spots on the secondaries.

Race *montana* Skinner is a very dark form, the upper surface with more extensive fuscous areas, and the under surface more brownish yellow than *pawnee*.

In eastern Nebraska and western Iowa another form is found which differs from both *ottoe* and *pawnee* and it seems desirable to name it. I therefore propose the name

Pamphila ogallala, n. form.,

after the branch of the Sioux Indians of that name. Its characteristics are as follows:

In size it will average slightly larger than *pawnee*, males measuring 40 mm. and females 46 mm. as against 34 mm. and 40 mm. in the case of *pawnee*.

♂ *Primaries* with fairly broad, fuscous border, not clearly defined, with pale fulvous irrorations over the fuscous borders, not forming distinct spots, however, as in *pawnee*. Less duskiness below stigma than in *pawnee*. *Secondaries* with larger fulvous area than in *pawnee;* fulvous tone of both wings tawnier than in *pawnee*. Under surface more ochreous than in *pawnee* and without spots on either wing.

♀. The greatest difference between *pawnee* and *ogallala* appears in this sex. While the ♀ *pawnee* is generally dark with well-defined pale

spots standing out in clear contrast, the ♀ *ogallala* is largely fulvous, with broad fuscous border on *primaries*, not clearly defined, the pale fulvous irrorations over fuscous borders forming fairly well-defined pale spots in apical portion; there is a rather prominent, almost square, semi-translucent spot under the cell, midway between base and outer margin, and a smaller triangular one above it and nearer outer margin; a fuscous patch between the large quadrate spot and base of wings. *Secondaries* fulvous with dentate fuscous border, fuscous costal edge, anal angle and inner margin. On under surface the pale spots of primaries show through, but the secondaries are unspotted.

Allotype—male, captured at Omaha, Nebraska; *holotype*—female, also captured at Omaha, both now in the collection of R. A. Leussler. Ten male and five female *paratypes* from Omaha, West Point, Lincoln and Valentine, Nebraska, and Sioux City, Iowa.

An examination of the genitalia of *pawnee* and *ogallala*, by Dr. A. W. Lindsey, indicates that the two forms are conspecific. A male *pawnee* which had been compared with specimens pronounced by Mr. E. A. Dodge to be typical (the type having been destroyed by fire) was used for this purpose. It is our opinion that both forms will prove to be conspecific with *ottoe*. In such case the following arrangement would seem to be proper

Pamphila ottoe Edw.
form *pawnee* Dodge
form *ogallala* Leussler
race *montana* Skinner

As a general thing *pawnee* flies in late August and early September and *ogallala* in late June and early July. There are exceptions to this rule, however, and we cannot therefore consider them strictly seasonal forms. Neither can we regard them as geographic races, since both occupy the same territory.

The Geographical Distribution of the Machaon-Group of the Genus Papilio (Lep., Rhop.).

The view has been expressed that the various species of the Genus Papilio, which are related to *P. machaon* Linnaeus, and are found in Eastern Asia and in North America, thence extending southward into South America, are derivatives of the European form first named by the Father of Natural History. As a student of paleontology and phylogeny, I wish to place upon record my dissent from this view. The metropolis of this group in my judgment is the western hemisphere, and the original center of dispersion was the region covered by the northwestern states of the United States and British Columbia. From this center of dispersal have radiated the various forms, and *P. machaon* represents the extreme westward extension of the group of allied forms.

This view is strictly in accord with what we now know as to the origin of certain mammalia; *e. g.*, the horse and the camel.

I have not time at the moment to go deeply into the subject, but desire to state that it appears to me far more reasonable, in view of

the large number of species, sub-species, and varietal forms which are found in North America and are referable to the *machaon*-group, to regard the New World as the original center of distribution, rather than Europe. The Papilionidae are represented in Europe by only a couple of stragglers, one of which is *P. machaon*. It is on the western periphery of the region occupied in migration, the center of original distribution having been as indicated above.

A great deal might be said in amplification of, and to sustain, this view, but I content myself at the moment with a bald statement of my general conclusion.—W. J. Holland, Carnegie Museum, Pittsburgh, Pa.

A Race of Papilio troilus from Southern Florida (Lep., Rhop.).

In the Royal Palm Hammock, at almost the extreme southern tip of Florida, I found, last winter, an interesting race of *Papilio troilus*. It is a form midway between the typical *troilus* and the var. *texanus* Ehr. The enlargement of the yellow submarginal spots is not so great as in *texanus*, but they are, and particularly on the fore-wings, larger and more brilliantly yellow than in *troilus*. The under side is especially brilliant; more so than either the typical *troilus* or *texanus*.

The Royal Palm Hammock is an interesting place. Made a State Park chiefly through the interest of Theodore Roosevelt, it is under the supervision of the federated women's clubs of the State of Florida. It is a bird sanctuary, and perhaps the last habitat of the great Ivory-billed woodpecker. It abounds in the beautiful and interesting tree-snails, *Liguus*, spec.? At the time of my visit, Feb. 24-28, 1920, the weather was cool and chilly, and insect life not abundant. My first insect on arriving was the *P. troilus* described above. In front of the "Club House" is a large patch of the pretty wild verbena, and it was here that I first, and always, found these butterflies, which fed greedily on the purple blossoms. A few Hesperidae were taken here, chiefly *P. maculata*, with one *P. palatka*. At dusk Sphingidae were plentiful, but only *E. lugubria*, *X. tersa*, *X. pluto*, with one *C. grotei* and one *P. lusca*.

I also took at a common weed (?) one *A. tantalus*, probably form *zonata*, in fine condition. Several species of Syntomidae were fairly plentiful.

Dr. Sanford took at Jupiter (Indian River), after my return North, an interesting variation of *P. troilus* ab. *radiatus* Strecker, which is now in my collection. This specimen is in general much like the typical *texanus*, but more intensely colored. The submarginal spots on the secondaries above are so enlarged that the black area between them and the marginal lunules is reduced to a mere line. The corresponding orange spots below are of large size and intense brilliancy. The second and third submarginal spots from anal angle, on the secondaries above, are prolonged into the discal area, being rather "rays" than spots, but only these two are so prolonged.—Wm. C. Wood, New York.

Miscellaneous Studies in the Family Aphididae (Hem. Hom.).[1]

By Albert F. Swain, Fresno, California.

V. Notes on Some Lachnids in the British Museum.

During the spring of 1919 the writer, while a member of the Detachment of United States Army Students in British Universities, had an opportunity to spend a few weeks in study at the Natural History Museum (British Museum), London. Unfortunately his time was limited, so only a portion of the aphid collection in the Museum was studied by him, having confined himself entirely to the study of the Lachnids in the Francis Walker and George Buckton Collections.

It is probable that the specimens in both of these collections are the ones from which Walker and Buckton drew up their descriptions, but unfortunately this is not at all certain. In neither collection do the specimens bear labels which would indicate whether or not they are type specimens, or whether they are the specimens used in the describing of the species. Those in the Buckton collection bear labels showing Buckton's determination, and in some few cases showing host and locality records. In the majority of the specimens the collection data are by means of key letters, the key to which is not now available. In the Walker collection the labels show his determination, host, locality and date of collection. As just stated, there is no certainty that these are the specimens from which Walker and Buckton drew up their descriptions and in some cases there is a discrepancy between their descriptions and the specimens. However the writer believes these were probably due to the lack of modern equipment, such as microscopes and micrometer scales, rather than to the fact that other specimens were used.

In the following notes the writer has listed the actual specimens available, and where discrepancies exist between them and the descriptions, such are noted. In addition the writer has attempted to place these species in their proper place as understood at the present time. In this he has followed the generic classification of A. C. Baker.[2] As for specific determi-

[1]This paper is a continuation of one, the first four parts of which were published in *Entomological News*, December 1918, pp. 361-369.

[2]Baker, A. C., U. S. Dept. Agr. Bull. 826, August, 1920.

nations he has been guided by the works of such aphid students as Cholodkovsky, Del Guercio, Mordwilko and others. Furthermore he wishes to acknowledge the many valuable suggestions received from and the very kind courtesy extended by Mr. Frederick Lainge of the Natural History Museum.

Tribe LACHNINI Baker.
Sub-tribe *Pterochlorina.*

1. **Stomaphis quercus** (Linn.). Walker; five slides (6 apterous ♀♀); *"quercus*; oak; Dulwich; Aug. 6-47."[3]

This is the very characteristic species found throughout Europe on oaks and the one for which Walker described the genus *Stomaphis.*[4]

2. **Pterochlorus longipes** (Dufour). Walker; four slides (2 alate, 2 apterous, several immature ♀♀); *"roboris*; oak; Southgate; July 5-47" (also July 27, Aug. 5 and Aug. 7, 1847).

These specimens agree very well with Walker's description except that the fourth and fifth antennal segments in the apterous females are equal, while the third is equal to the combined lengths of the two, and the rostrum extends only to the base of the third abdominal segment. Walker states that the fourth antennal segment is "less than half the length of the third; the fifth a little shorter than the fourth," and that the rostrum reaches to the "hind hips."

These differences are however of only minor importance. There is no doubt in the writer's mind that this is the same species that Del Guercio described as *Dryaphis longipes* (Dufour), although Del Guercio makes no mention of the sensoria that appear on the third, fourth and fifth antennal segments of the alate female. As Del Guercio points out, Buckton's *Dryobius croaticus* Koch is in all probability this same species, but his *Dryobius longipes* (Dufour) is not this one. That species belongs to the subtribe *Lachnina* of Baker, and not to the *Pterochlorina*, and specimens in his collection appear to be the same species as Walker's *piceae*, with the possibility of an incorrect host plant determination, or they may be an unnamed species very closely related to that one. See the discussion under *Dilachnus piceae* (Walker) No. 13 below.

[3]In each case the writer has listed the number of slides, with the number of specimens thereon, the collection in which they are found, and the data which appear on the labels.

[4]Walker, Francis. The Zoologist, vol. 28, p. 2000, 1870.

3. **Pterochlorus roboris** (Fabr.).

There are no specimens of this species in either the Walker or Buckton collections and it is included here only because it has been recorded by Morley[5] from the Isle of Wight, although it is possible that he had the same species as did Walker and followed him in naming it. However Lainge tells the writer that it is a very common species throughout England and Scotland.

4. **Pterochlorus cistatus** (Walker) Buckton.

What this species is the writer has no idea as Buckton's description is very meagre and there are no specimens in either collection that could very well fit the description.

5. **Pterochlorus viminalis** (Boyer). Buckton; four slides (2 alate, 2 apterous ♀♀); "*saligna* Sulz." taken from willow at Charshalton.

This is a common species in southeastern England, and for that matter throughout Europe and America. Morley has recorded it from Ipswich and Theobald from Kent.

Sub-tribe *Eulachnina*.

6. **Eulachnus agilis** (Kalt.). Walker; three slides (2 alate, 4 apterous, 1 immature ♀♀); "*agilis*; Scotch Pine; Southgate; June 15-47." Buckton; two slides (2 apterous, 3 immature ♀♀); "*agilis*." These specimens differ from Kaltenbach's description in that the sixth antennal segment of the alate female is subequal to the fifth and not "half as long as the fifth."

Koch figures the apterous of this species as a variety of *pineti* Fabr. Cholodkovsky states that the fourth antennal segment in the alate female is a little shorter than the fifth and much longer than the sixth. In these specimens, however, they are all three subequal. This is without doubt the true *E. agilis* (Kalt.). Theobald records this species from Kent, Morley from Suffolk, and Miss Jackson[6] from Scotland.

Sub-tribe *Lachnina*.

7. **Lachnus fasciatus** Burm. Walker; two slides (2 alate, 3 apterous ♀♀); "*costata*; Spruce fir; Southgate; June 25-47." (Also June 30-47).

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[5]Morley, Claude. Jottings on Aphides taken during 1907 and 1908. The Entomologist, vol. 41, pp. 233-237, 1908.

[6]Jackson, Dorothy J. Further Notes on Aphides Collected principally in the Scottish Highlands. Scottish Naturalist, pp. 157-165, Sept.-Oct., 1919.

This species is the *fasciatus* Burm. of Del Guercio and other European students (*farinosa* Cholod.), the lanceolate rostrum, short first joint of the hind tarsus, the once-branched media, and the shaded forewings being quite typical. Walker indicates in his description that the media is twice-branched, but such is not the case in his specimens. Theobald records this from Kent, and Jackson from Kent and Scotland.

8. **Schizolachnus tomentosus** (De Geer). Walker; three slides "*pineti;* Scotch pine; Southgate; June 25-47;" one slide; "*pineti;* Scotch fir; Southgate; June 15-47." Buckton; three slides (2 alate, 2 apterous and 1 immature ♀♀); "*Mindarus abietinus* Koch." Buckton; three slides (1 alate, 1 apterous, several immature ♀♀); "*Schizoneura fuliginosa* Buck."

All these are the same species, and are the one described by Del Guercio as *tomentosus* (De Geer), not his *pineti* Koch. The media is once-branched, rather than twice-branched as indicated by Walker. This is indeed the *pineti* of Fabricius, which is a synonym of *tomentosus* De Geer. *Lachnus pineti* Koch is a different species.

9. **Dilachnus cupressi** (Buckton). Buckton; one slide (1 alate, 4 apterous, and 1 immature ♀♀); "*Lachnus cupressi;* Cornwall; Nov." This is the species described by Buckton from cypress at Cornwall, and these are perhaps the type specimens. Additional descriptive notes are herewith appended:

Alate viviparous female. Body rather small; antennae rather long for a Lachnid, reaching to the base of the abdomen, pale except at joint and segment VI. III with 3-4 secondary sensoria on apical half, IV with 2 secondary sensoria on apical half, and V with one secondary and one primary sensorium, VI with the usual primary and accessory sensoria. III is the longest segment, with IV, V, and VI subequal, combined being longer than III (V slightly longer than IV or VI, the latter two being practically equal). Cornicles quite large and prominent, being half as long (high) as wide at the base; dark colored. Cauda prominent, half-moon-shaped. Legs quite long. Body covered with many fine hairs, which appear longest and thickest on cauda, antennae and legs. Beak lanceolate, reaching to the base of the second abdominal segment. Measurements: Body length 2.487, width at thorax 0.969, width between eyes 0.350, antennae total 1.204-1.210, III 0.420-0.434, IV 0.182-0.190, V 0.210-0.215, VI 0.182-0.196 mm.; cornicles height 0.126-0.154, width at base 0.280, width at apex 0.075-0.080; hind tarsi 0.070 x 0.294; 0.070 x 0.312, wings length 3.88-4.06, width 1.39-1.42, expansion 9.04 mm. Media rather distinct for a lachnid, twice-branched. Stigma long and rectangular.

The only other record of this species the writer has been able to locate is that of Cholodkovsky who reports having taken a species which he believes to be this from "Der Krim" in October.

10. **Dilachnus hyalinus** (Koch). Buckton; one slide (2 alate ♂♂, 1 apterous and 1 immature ♀♀); *"macrocephalus;* Bramshot." Buckton; one slide (1 apterous ♀); *"abietis* Walker."

This species from *Picea excelsa* is the one described by Buckton as *Lachnus macrocephalus* sp. n., but which Cholodkovsky and Del Guercio place as a synonym of *Lachnus hyalinus* Koch. Mordwilko states that it is possibly a synonym. Buckton records it from Bramshot and Walthamston and Morley from Ipswich.

11. **Dilachnus juniperi** (De Geer). Walker; three slides (5 alate, 10 apterous, several immature ♀♀); *"juniperi;* juniper; Southgate; June 4-47 (also June 25)." Buckton; three slides (2 alate, 7 apterous ♀♀).

This is the species described by Del Guercio as *Lachniella juniperi* (Fabr.), (De Geer first named and described this species 1780), the sensoriation being typical.

In the alate females secondary sensoria occur as follows, III 6-7, IV 2-3, V 1-2; in the aptera IV 1-2, V 1. Antennal measurements of four alates are III 0.316-0.392 (0.364), IV 0.154-0.196 (0.168), V 0.210-0.238 (0.224), VI 0.210-0.252 (0.238) mm. The venation is irregular inasmuch as although the media is typically twice-branched, in two specimens both wings show the media but once-branched.

This species has been reported by Theobald from Kent and by Jackson from Kent and Scotland.

12. **Dilachnus laricis** (Walker). Walker; two slides (2 alate, 3 apterous, and 1 immature ♀♀); *"laricis;* larch; Southgate; July 25-47" (also August 2-47). The apterae of this species are very characteristic in that the body is covered with more or less distinct tubercles, these being the most prominent on the front of the head.

Without doubt this is the same species that Del Guercio[7] records from larch at Protolina, Italy, and describes as *Lachniella nigrotuberculata* n. sp., the body tubercles on the apterous females being so very characteristic.

(To be continued.)

[7]Redia, vol. 5, pp. 306-309, 1908.

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., JULY, 1921.

The Importance of Collecting.

Elsewhere in the present number of the NEWS we notice the *Report of the Proceedings of the Third Entomological Meeting held at Pusa* (India). To those Proceedings Dr. David Sharp contributed a brief paper entitled "The Importance of Collecting." As few of our readers, probably, will see the original and as the paper, coming from such an eminent entomologist, is of universal application, we believe we cannot do better for our editorial page than to quote from Dr. Sharp's remarks, as follows:

> Many who have a taste for entomology begin collecting with enthusiasm, but after a time diminish their efforts or even altogether abandon them. There are numerous reasons that account for this fact, but . . . . . I need allude to but one of them, and that is a belief that collections are more advanced and nearer completion than the other branches of entomology are. This I believe to be a great error . . . .
>
> The great sociologist Herbert Spencer held that it was amongst the very first duties of a civilized community to make itself thoroughly acquainted with the environment among which it lives.
>
> Alas, to think how very far we are from this. There is not a single square mile of the earth's surface of which we know thoroughly the fauna and flora. Hence the number of existing forms with which we are totally unacquainted is very great, and I feel that I need not insist on this, for I believe all entomologists will admit it . . . .
>
> But to get together a collection of all the insects of a limited region is merely to lay one of the foundation-stones of the science of entomology in that region. For we have not only to recognize that the creatures exist, but also to become acquainted with their variation, their distribution and their habits; to study the anatomy and the development of each species, and (as many at least among us recognize) their evolution, *i. e.*, the relation of their generations. And what a huge number of specimens is required for all these purposes, of this huge number of kinds that we believe to be in existence.
>
> I say then, do not discontinue collecting but go on with it with the greater knowledge and discretion that your experience may suggest.
>
> I urge this because entomology is the science of many generations. In a hundred years (I might say a thousand with almost equal truth)

entomology will still be in a rudimentary state; but in that period many of the species of animals now existing will have become extinct. The constant extinction of other animals by the extension of civilization is one of the saddest facts that the naturalist is forced to recognize, and we should at least endeavor to preserve some record of them for the instruction of posterity. It is frequently said nowadays that posterity can take care of itself, but it cannot do so in the matter of a knowledge of the animals that we have caused to cease to exist.

. . . . . I can merely add that in my opinion the advancement of collections should be attained by international combination. For want of this the extremely limited resources of entomology are much wasted, and the admirable enthusiasm of collectors is smothered if not entirely extinguished.

"To become acquainted with their distribution, . . . their evolution," "to preserve some record of them," means not only to accumulate the specimens themselves but to attach to them written or printed records of the localities and the dates where and when they were collected, and, if bred, the circumstances and the parentage. Locality is geographical, topographical and ecological. It is often easier to obtain and to attach these data than it is to collect the specimens, and yet how often are these data (as valuable as the insects themselves) lacking!

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE

Rearing Anthomyid Root Maggots on Artificial Media (Dipt.).

The use of nutritive broth (bouillon) for the rearing of Dipterous larvae by the French Entomologist, Jean Henri Fabre, has suggested a practical method for observing the larval changes of certain Anthomyidae which normally feed within the tissue of the host plant. Experiments with the Onion Maggot, *Hylemyia antiqua* Meig., and the Cabbage Maggot, *Hylemyia brassicae* Bouché, have demonstrated that these species may be successfully reared on agar jelly containing a high percent extract of the larval food plant.

Onion agar was prepared by adding ten per cent. commercial agar to a filtered stock of boiled onion. Cabbage agar was made in the same manner, using a stock of boiled cabbage. These media were filtered, tubed and sterilized for fifteen minutes under twenty pounds pressure. Agar slants in large test tubes or poured plates in petri dishes were best adapted for rearing purposes. Female flies fed on these media and laid their egg clusters on the surface. The eggs were removed, washed

in sterile water, and transferred to fresh agar to avoid contamination.

The larvae hatched in several days and fed on or near the surface of the agar and, owing to its transparency, could be observed in each instar. Puparia were formed on the walls of the test tubes or petri dishes, but best results were obtained by transferring the full grown larvae to shallow containers of earth and allowing them to pupate there. Bacterial contamination of the media or the presence of large amounts of water of condensation proved fatal to the larvae and necessitated frequent transferring to fresh agar.—JOHN R. EYRE, Pa. State College Exper. Sta., Girard, Pennsylvania.

Life History of Pyrameis caryae in California (Lep., Rhop.).

Pyrameis caryae is a very common butterfly in our State of California, especially in San Francisco and vicinity. It flies abundantly from July to the end of November. I took one *P. caryae* var. *muelleri* Letcher, on January 1st, 1918, and another February 27th, 1919. I captured some every month except March, April and May. My reason for writing these few lines about its life history is because during the past three years I have captured four *P. caryae* var. *muelleri* in my garden, and in 1920 I came to the conclusion that I would employ some of my time in studying carefully their movements in my own garden and try to find out whether there might be some *P. caryae* var. *muelleri* amongst them. As soon as the caterpillars reached almost their full size, I removed and placed them in breeding cages, so as to obtain the best result, but, to my great disappointment, out of such a large number as forty-three caterpillars not one *P. caryae* var. *muelleri* appeared; all those that emerged from the chrysalids (except a few that were parasitized) were typical *P. caryae*.

One adult female carries from 75 to 85 eggs. The eggs are deposited upon the leaf of the food-plant, mallow (*Malva borealis*), upon which the caterpillars, after they are hatched, are destined to live, and the female reveals wonderful instinct in selecting plants which are appropriate to the development of the larvae. No more than five or six eggs are deposited singly upon the same leaf and always on the upper side of it. The eggs resemble the shape of a bird's egg, broken in at the top, and are pale green when first deposited, later changing to a darker color just before hatching. As soon as the young caterpillar emerges from its egg it commences to build its web; I suppose, to be protected against bad weather and also against some injurious insects, especially the ants and the spiders, which are very destructive to the young larvae. It takes eighteen to twenty days for a caterpillar to grow to its full size, namely, 1½ inches when crawling. Sometimes the caterpillar, after having eaten almost the whole leaf before arriving at its natural size, moves away from it and goes to a fresh one, but never does it construct a new web. Generally a full-grown caterpillar, after having been under its web for eighteen to twenty days, leaves its leaf to find a suitable

place to pupate, such as on the walls of the house, stumps, stones, fences, etc.; but never more than six feet from the ground. The caterpillars vary much in color when very small; at the first stage of their existence they are almost black, in the second stage, black and yellow, and in the third stage, black and yellow and sometimes a mouse gray color. Their food plants are also *Ligustrum*, common name California Privet, and Lavander.—J. C. HUGUENIN, San Francisco, California.

Entomological Literature

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species, will be recorded.

The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

The records of papers containing new genera or species occurring north of Mexico are all grouped at the end of each Order of which they treat.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also, Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

The titles occurring in the Entomological News are not listed.

5—Psyche, Cambridge, Mass. **6**—Journal of the New York Entomological Society. **9**—The Entomologist, London. **10**—Proceedings of the Entomological Society of Washington, D. C. **11**—Annals and Magazine of Natural History, London. **19**—Bulletin of the Brooklyn Entomological Society. **20**—Bulletin de la Societe Entomologique de France, Paris. **33**—Annals de la Societe Entomologique de Belgique, Brussels. **36**—Transactions of the Entomological Society of London. **68**—Science, Lancaster, Pa. **71**—Novitates Zoologicae Tring, England. **77**—Comptes Rendus des Seances de la Societe de Biologie, Paris. **87**—Arkiv for Zoologi, K. Svenska Ventenskapsakademien, Stockholm. **101**—Journal of The Linnean Society of London. **103**—Biologisches Centralblatt, Leipzig. **111**—Archiv fur Naturgeschichte, Berlin. **116**—Entomologische Zeitschrift, Frankfurt a. M. **118**—Die Naturwissenschaften, Berlin. **122**—Proceedings of the Entomological Meetings, Pusa, India.

GENERAL. Beeson, C. F. C.—Breeding cages and general insectary technique for wood-borers. Note on the decimal method of subject indexing entomological literature. **122,** iii, 892-5; 1048-51. **Fletcher, T. B.**—Notes on rearing insects in hot climates. Hints on collecting and preserving insects. **122,** iii, 875-92; 936-74. **Hankin, E. H.**—A method of preserving butterflies and other insects. **122,** iii, 974-6. **Hewitt, C. G.**—Obituary by N. Criddle. (Canadian Nat., xxxiv, 174-6). **Muir, F.**—A symbiotic organism in Fulgorids. **5,**

xxviii, 59-60. **Sharp, D.**—The importance of collecting. **122,** iii, 976-8. **Slater, A. W.**—The preparation and reproduction of scientific illustrations. **122,** iii, 1043-48. **de la Torre Bueno, J. R.**—Standardized descriptions. **19,** xvi, 60-1. **Vogt, O.**—Ergebnisse der analyse gewisser merkmale einger insektengattungen. **118,** xviii, 350-3. **Wells, B. W.**—New United States zoocecidia. **5,** xxviii, 35-45.

ANATOMY, PHYSIOLOGY, ETC. Cappe de Baillon, P.—Contribution anatomique et physiologique a l'etude de la reproduction chez les Locustiens et les Grilloniens.—I. La ponte et l'eclosion chez les Locustiens. (La Cellule, xxxi, 1-245.) **Crampton, G. C.**—The phylogenetic origin of the mandibles of insects and their arthropodan relatives. **6,** xxix, 63-100. Preliminary note on the interpretations of insectan and myriopoden structures through a comparison with the structures of Crustacea. **36,** 1920, 340-6. **Deegener, P.**—Soziologische studien an raupen und bemerkungen uber licht- und statischen sinn. **111,** 1920, A 10, 91-154. **Enslin, E.**—Die irrtumer der these einer wiederkehrenden terziarzeitahnlichen tierlebensperiode. **116,** xxxv, 5-6 cont. **Evans, A. M.**—On the structure and occurrence of maxillulae in the order of insects. **101,** xxxiv, 429-56. **Galant, S.**—Reflex und instinkt bei tieren. **103,** xli, 193-210. **Goldschmidt, R.**—Untersuchungen uber intersexualitat. Erblichkeitsstudien an schmetterlingen III. Der melanismus der nonne, Lymantria monacha. (Zeit. Indukt. Abstam. u. Vererbungslehre, xxiii, 1-199; xxv, 89-163.) **Haecker, V.**—Weitere phanogenetische untersuchungen an farbenrassen. (Zeit. Indukt. Abstam. u. Vererbungslehre, xxv, 177-84.) **Holmgren, N.**—Zur ontogenie der stomodealbrucke bei den spinnentieren. Vergleichendes uber den kopfbau der crustaceen und hexapoden. **87,** xiii, No. 1; No. 5. **Jordan, K.**—On the replacement of a lost vein in connection with a stridulating organ in a . . . moth from Madagascar. . . **71,** xxviii, 68-74. **Klatt, B.**—Keimdrusentransplantationen beim schwammspinner. (Zeit. Indukt. Abstam. u. Vererbungslehre, xxii, 1-50.) **Lyssy, R.**—Recherches experimentales sur le venin des abeilles. (Archiv. Intern. Physiol., xvi, 272-87.) **Minnich, D. E.**—An experimental study of the tarsal chemoreceptors of two nymphalid butterflies. (Jour. Exper. Zool., xxxiii, 173-203.) **Oguma, K.**—The idiochromosomes of the mantis. (Jour. Col. Agric. Sapporo, Japan, x, 1-27.) **Paillot, A.**—Influence de la temperature sur le mechanisme de l'immunite humorale chez les insectes. **77,** lxxxiv, 737-9. **Quast, M.**—Beitrage zur kenntnis der samenubertragung bei Ephestia kuehkniella. **111,** 1920, A 10, 70-90. **Reinking, O. A.**—The synchronal flashing of fireflies. **68,** liii, 485-6.

ARACHNIDA, &c. Vitzthum, H.—Acarologische beobachtungen. **111,** 1920, A 10, 1-69.

NEUROPTERA. Howe, R. H.—The distribution of New England Odonata. (Proc. Boston Soc. Nat. Hist., xxxvi, 105-33).

Klapalek, F.—Plecopteres nouveaux. **33,** 1921, 146-50.

HEMIPTERA. Baker, A. C.—On the family name for the plant lice. **10,** xxiii, 101-3. **Brethes, J.**—Description d'un Ceroplastes de la Republique Argentine, et de son parasite. **20,** 1921, 79-81. **Hickman, D. J.**—Illustrations of the male hooks in Nabis. **19,** xvi, 58-9. **Malloch, J. R.**—Systematic notes on Hemiptera Heteroptera. **19,** xvi, 54-6. **Olsen, C. E.**—Another European leafhopper in N. America. **19,** xvi, 33-7. **de la Torre Bueno, J. R.**—New records of Florida bugs. **19,** xvi, 61.

Barber, H. G.—Revision of the genus Ligyrocoris. **6,** xxix, 100-14.

LEPIDOPTERA. Cleare, L. D.—Butterfly migrations in British Guiana. **36,** 1920, 331-39. **Joicey, J. J.**—New forms of Sphingidae. **9,** liv, 105-9. **Mousley, H.**—Further notes on the Rhopalocera or butterflies of Hatley, Stanatead Co., Quebec. (Canadian Nat., xxxiv, 173-4). **Strand, E.**—Systematisch-faunistische beitrage zur kenntniss exotischer heterocera und Grypocera. . . . **111,** 1920, A. 7, 113-72.

Fox, C. L.—A new aberrant form of Vanessa virginiensis. **5,** xxviii, 45-6.

DIPTERA. Alexander, C. P.—The crane-flies collected by the Swedish expedition to southern Chile and Tierra del Fuego. A new genus and sp. of net-winged midge Blepharoceridate and an undescribed sp. of Tanyderidae. **87,** xiii, No. 6; No. 7. **Collin, J. E.**—A contribution towards the knowledge of the Anthomyiid genera Hammomyia and Hylephila. **36,** 1920, 305-26. **Dyar, H. G.**—The mosquitoes of Canada. (Trans. R. Canadian Inst., xiii, 71-120). **Greene, C. T.**—Further notes on Ambopogon hyperboreus. **10,** xxiii, 107-9. **Malloch, J. R.**—Exotic Muscaridae—II. **11,** vii, 420-31. **Notman, H.**—A compound larva. **19,** xvi, 57. **Phibbs, G. B.**—Variations in the segmental spines of the fourth-stage larva of Hypoderma bovis. (Irish Nat., xxx, 53-7).

Felt, E. P.—New sps. of reared gall midges. **6,** xxix, 115-18. **Johnson, C. W.**—New diptera from Texas and Mexico. **5,** xxviii, 56-9. **McAtee, W. L.**—District of Columbia diptera: Scatopsidae. **10,** xxiii, 120-4. **Malloch, J. R.**—A new genus of Anthomyiidae. **19,** xvi, 53.

COLEOPTERA. Aurivillius, C.—Neue oder wenig bekannte coleoptera longicornia. **87,** xiii, No. 9. **Bernhauer, M.**—Neue Aleocharini aus Sudamerika. Zur Staphylinidenfauna Sudamerikas, insbesondere Argentiniens. **111,** 1920, A 8, 141-70; 170-84. **Bowditch, F. C.**—

Notes on the S. American Lacticas. **5,** xxviii, 47-50. **Brethes, J.**—Description d'un nouveau Colydiidae de Buenos-Aires. **20,** 1921, 70-1. **Hayes, W. P.**—A malformation in Lachnosterna. **19,** xvi, 38-40. **Horn, W.**—Wissenschaftliche ergebnisse der schwedischen entomologischen reise . . . in Amazonas. Cicindelidae. **87,** xiii, No. 10. **Kasergode, R. S.**—On some of the bionomics of Bruchidae. **122,** iii, 928-31. **Kleine, R.**—Die deckenzeichnungen der Brenthidae. **111,** 1920, A 8, 1-83.

Fall, H. C.—A new Lixus from New Jersey. **19,** xvi, 40-1.

HYMENOPTERA. Brethes, J.—(See under Hemiptera.) **Parker, J. B.**—Notes on the nesting habits of Tachytes. **10,** xxiii, 103-7. **Roman, A.**—Wissenschaftliche ergebnisse der schwedischen entomologischen reise . . . in Amazonas. Chrysididae & Chalcididae. **87,** xii, No. 19. **Wheeler, W. M.**—Observations on army ants in Britsh Guiana. (Proc. Amer. Acad. Arts & Sci., lvi, 291-328).

Cushman, R. A.—The males of the ichneumon genera Myersia and Thaumatotypidea, with description of n. sps. **10,** xxiii, 109-12. **Gahan, A. B.**—Remarks on the genus Pleurotropis with description of a parasite of Trachelus tabidus. **10,** xxiii, 113-20. **MacGillivray, A. D.**—New species of Emphytinae and Selandriinae. **5,** xxviii, 31-5.

INSECT PESTS OF FARM, GARDEN AND ORCHARD. By E. DWIGHT SANDERSON. Second Edition Revised and Enlarged by LEONARD MARION PEAIRS. New York: John Wiley and Sons, Inc., London: Chapman & Hall, Limited. 1921. 12mo, pp. vi, 707; 602 figures in the text.—A number of recent American texts on the insect enemies of cultivated plants are now available. If a small volume, in which the insects are considered from the standpoint of their own taxonomic groups, is desired, there is Prof. Herbert Osborn's *Agricultural Entomology* (1916). Prof. Wm. Lochhead's *Class Book of Economic Entomology* (1919) is more extended and deals first with insects injurious to each crop or plant, with cross references to Part III on the taxonomic insectan groups. Prof. Washburn's *Injurious Insects and Useful Birds* (1918) and Prof. O'Kane's *Injurious Insects, How to Recognize and Control Them* (1912) are still larger books in which the treatment is by the objects damaged. Much more detailed, but of narrower scope, are Slingerland and Crosby's *Manual of Fruit Insects* (1914) and Prof. G. W. Herrick's *Insects Injurious to the Household and Annoying to Man* (1914), in both of which the sequence of topics is that of the things injured. The last two works presuppose, or at least do not present, a general sketch of insect structure and development. In the other four such a general account is included and this explains the relative number of pages devoted to insects in general and to general

methods of control in the six volumes respectively: 35, 112, 67, 104, 26 and 20.

The present volume by Profs. Sanderson and Peairs is larger than any of those mentioned and more extended in its treatment of the topics common to it and to the first four named, but covers less ground in those parts corresponding to the subject matter of the last two. Thus it devotes 210 pages to insect enemies of orchards and small fruits, with which almost the whole (or 465 pages) of Slingerland and Crosby's book is concerned, the corresponding figures for Lochhead being 40-50, for Washburn 105, and O'Kane 125.

The first edition, by Prof. Sanderson alone, appeared in 1912.* Prof. Peairs has now made a thorough revision of the original text, added several new articles and three new chapters dealing with insects injurious to citrus fruits (Chap. XXVII), to man and in the household (XXVIII) and to domestic animals and poultry (XXIX). The first chapter gives some figures showing the tremendous damage done in the United States to various crops by insects, aggregating 2¼ billions of dollars annually. Beneficial insects, structure and development of insects, farm methods for their control, insecticides and spraying and dusting apparatus each receive one chapter. Chapters VII to XXVI consider the insects injurious to farm, garden and orchard from the standpoint of the plants damaged, and the methods for checking them. The book is clearly written, fully illustrated and should be very useful to those desiring a treatment of the subject matter, of medium length, as indicated by the comparisons given above.—PHILIP P. CALVERT.

REPORT OF THE PROCEEDINGS OF THE THIRD ENTOMOLOGICAL MEETING. Held at Pusa on the 3rd to 15th February, 1919. In three volumes. Edited by T. BAINBRIGGE FLETCHER, R.N., F.L.S., F.E.S., F.Z.S., Imperial Entomologist. Calcutta, Supt. Govt. Printing, India. 1920. 8vo. Pp. xii, 417, pls. 1-69; pp. vi, 418-835, pls. 70-129; pp. vi, 836-1137, pls. 130-182. 17 rupees, 8 annas. The Preface in Vol. I states: "The following report contains an account of the Proceedings of the Third Entomological Meeting . . . . As in the case of the Report of the Proceedings of the Second Entomological Meeting, every endeavor has been made to provide as full and complete a record as possible. A mere abstract is of very little use to those workers who require to refer to the record for references on particular points. The cordial reception accorded to the preceding Report has indicated clearly the general appreciation of a detailed record of the Proceedings of a Meeting of this kind . . . . This Report contains a record of ninety-two original papers read at the Meeting, exhibitions and discussions, covering various aspects of Indian Entomology. It will, I hope, be found useful by all

* See Ent. News, xxiii, p. 188. Most of the other books mentioned above were noticed in the News of the years of their respective appearance, or of the year immediately following.

interested in Entomology, both in and outside of India . . . . no Report was published of the First Entomological Meeting held in 1915. The Report of the Second Meeting, held in 1917, is still available."

The fact that the Report of the Second Meeting* occupied but a single volume of xii and 340 pages shows how much Indian entomology grew during the two years between the two meetings. The attendance at the Third Meeting was forty-six, while sixteen non-attendants contributed papers; among the latter we find the names of Prof. Brues, of Harvard; Mr. D. T. Fullaway, of Hawaii; Prof. E. B. Poulton, Dr. David Sharp and Messrs. E. Meyrick and J. H. Watson, of England.

As one might infer the greater part of these three volumes is occupied with the consideration of Indian insects of economic importance; indeed, pages 33-314 contain Mr. Fletcher's "Annotated List of Indian Crop Pests," with numerous brief remarks by those present at the meeting. Such articles, no doubt, will be helpful to economic entomologists in other lands in the case of widely distributed species. Of more present interest are perhaps two papers on the Pink Bollworm in Egypt by Dr. L. H. Gough and Mr. F. C. Willcocks respectively, and on the "Control of the Melon Fly in Hawaii, by a Parasite [*Opius fletcheri*] introduced from India," by D. T. Fullaway. The technique of insect breeding, collecting and preserving forms the subject of five papers. Entomological publication and education are considered and in the third volume are several articles of general entomological bearing, such as the insect prey of birds, spiders as checks on Lepidopterous larvae, the importance of insects to fisheries, the preparation and reproduction of scientific illustrations, the decimal method of subject-indexing entomological literature, etc. Altogether we congratulate our Indian colleagues on their activity and interest as shown by these three volumes.—P. P. CALVERT.

HUMAN PARASITOLOGY with Notes on Bacteriology, Mycology, Laboratory Diagnosis, Hematology and Serology. By DAMASO RIVAS, Asst. Prof. of Parasitology, etc. [Medical School], University of Pennsylvania. Philadelphia and London: W. B. Saunders Co. 1920. 8vo. 715 pp., 16 pls., 422 text figs.

PARASITES AND PARASITOSIS OF THE DOMESTIC ANIMALS. By B. M. UNDERHILL, V.M.D., Prof. of Parasitology, School of Veterinary Medicine, University of Pennsylvania. New York: The Macmillan Co. 1920. 8vo, pp. xix, 379, 8 pls., 172 text figs.

These two text-books, emanating from two schools of the University of Pennsylvania, naturally include the parasitic arthropods. Dr. Rivas devotes to them 113 pages (464-475 Arthropods in general, 476-496 Arachnida, 497-576 Insecta); Dr. Underhill gives them 142 pages (13-22 Arthropods and Insects in general, 23-93 Insects, 94-154 Arachnids). In the first book, Part I is general and introductory (pp. 17-48), Parts

* See Ent. News, xxix, p. 277.

II and III deal with animal parasites, Part IV with vegetable parasites, Part V with technique; the arrangement of Parts II-IV is by taxonomic groups. Dr. Underhill divides his subject matter into Part I, The External Parasites (pp. 1-154, including two general chapters); Part II, The Internal Parasites (pp. 155-310), and Part III, The Pathogenic Protozoa (pp. 311-352); within each part the sequence of topics is that of the systematist. To each of his chapters Dr. Rivas has added a list of selected references to the appropriate literature. Each teacher of parasitology has his own preferences as to the method of treatment of the subject and no doubt these two additions to the growing list of books on medical and veterinary entomology will prove to be desirable to many who are not altogether satisfied with previous texts.—P. P. CALVERT.

Doings of Societies.

Entomological Section of The Academy of Natural Sciences of Philadelphia.

Meeting of December 13, 1920, Director Philip Laurent presiding. The annual reports were read; the condition of the ENTOMOLOGICAL NEWS for the past year and the prospects for the future were discussed. A method for advertising the purposes and activities of the Section was discussed and the matter put in the hands of the Publication Committee for further development. The following dates were selected for holding the meetings during 1921: January 27, March 24, May 26, September 22, November 17, and December 12.* The following officers and committee were elected to serve during 1921: Director, Philip Laurent; Vice-Director, R. C. Williams, Jr.; Secretary, J. A. G. Rehn; Recorder, E. T. Cresson, Jr.; Treasurer, E. T. Cresson; Conservator, Henry Skinner; Publication Committee, E. T. Cresson, P. P. Calvert, E. T. Cresson, Jr.

Meeting of January 27, 1921, Director Laurent in the chair. Fourteen persons present.

The chair reported the death of Mr. James S. Johnson, of Philadelphia, on December 14, 1920. He was a well-known collector of Lepidoptera, and his collection contained all or nearly all the species of *Catocala* found around Philadelphia.†

Mr. Kisliuk spoke about some of the pests he recently encountered, among which were the pink cotton boll-worm infesting burlap covering on goods from Holland: *Emphytus cinctus* on rose stock, and a species of *Bruchus* on *Cassia abbreviata* from Northern Rhodesia.

*Alternating with meetings of the American Entomological Society in the other months, except July and August.

†Obituary notice in this volume of the NEWS, page 63.

HEMIPTERA.—Dr. Skinner exhibited specimens of Coccidae, *Lecaniodiaspis tessellata*, on the Tulip Poplar from Fairmount Park, Philadelphia.

LEPIDOPTERA.—Mr. Laurent exhibited specimens of all the species of butterflies formerly belonging to the genus *Pamphila*, now divided into 22 genera, that have been recorded from Pennsylvania and New Jersey. In his remarks he stated that he had captured 21 of the 30 species either in New Jersey or Pennsylvania, and had studied the early stages of 16.

Dr. Skinner called attention to a pair of specimens exhibited by Mr. Laurent as belonging to a species he recently described from Haiti. *Choranthus haitensis* (Ent. News, xxxi, 187). These specimens were captured in April at Guntown, Levy County, Florida.

ORTHOPTERA.—Mr. Rehn made a few remarks on the African cockroaches of the sub-family Perisphaerinae, illustrating his remarks with representatives of both sexes of eight genera. The speaker discussed the sexual dimorphism shown and also explained the peculiar pronotal modifications found in these genera. He spoke about the recent discovery of a species of the orthopterous genus *Atlanticus* in China. The genus was previously known only from North America.

Meeting of March 24, 1921; eight persons present. In the absence of the Director and Vice-Director, Dr. Skinner presided.

The Publication Committee submitted a draft of a circular of general information which they were ordered to compile. This was approved by the Society and referred by them to the Section for further action. The circular was ordered to be printed from the draft as submitted.

Correspondence from Jacques Lefevre was read, stating that he was to collect in Brazil and would like to hear from any one desiring Coleoptera or Lepidoptera from that locality.

Messrs. John C. Hollinger, Max Kisliuk, Jr., and Richard C. Norris, Jr., were elected contributors.

DIPTERA.—Mr. Cresson exhibited some chrysanthemum leaves which were infested with galls, from which had been reared a species of Cecidomyiidae, shown in balsam mounts. The species is not determined as yet.

LEPIDOPTERA.—Dr. Skinner exhibited some twigs of the wild cherry to which were attached very small cocoons, which he supposed to be those of a species of microlepidoptera of the genus *Coptodisca*. He also exhibited some lepidopterous larvae which had been preserved in listerine. They have been immersed now for over a year and have not changed color.

ORTHOPTERA.—Mr. Rehn spoke about some Orthoptera received for determination from Mr. E. R. Buckell, collected in the northern part of British Columbia, between the Chilcotin and Fraser Rivers, many species of which were found to be injurious to the range. The speaker said that the collection has enabled him to extend northwards the distribution of a few of the known species.—E. T. CRESSON, JR., *Recorder*.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and only when necessary those at the top (being longest in) are discontinued.

Wanted—N. A. Coleopterists interested in European Coleoptera. Liberal exchanges and friendly correspondence. Mr. C. Crozet, 155, Via Cavour, Rome, 23, Italy.

Wanted—To examine, determine and exchange Cicadellidae or "Jassidae" from all parts of North America. J. G. Sanders and D. M. DeLong, State Capitol, Harrisburg, Pa.

Lepidoptera.—Offer in exchange for rare S. American Lepid., about 400 Rhopalocera in papers from S. Cameroun (Africa), mostly Papil. Pierid, Danaid, Satyrid and Nymphal.—J. H. Jurriaanse, Shiekade 75, Rotterdam, Holland.

Twenty-nine 12 x 15 insect boxes for exchange for Elateridae not in my collection. Address H. B. Kirk, 1902 North St., Harrisburg, Pa.

Wanted—Cynipidae and their galls from all parts of the world for cash or exchange. Wm. Beutenmuller, Box 258, Highwood, N. J.

Lepidoptera—Offer many palae. species, especially from the Swiss and French Alps with full data to exchange. Also have many papers and books on Lepidoptera and other insects. Albert Oertel, Riebeck Str., 5, Leipzig, Germany.

Pacific Coast Lepidoptera for exchange by our Club. Send your list. Exchange Dept., Entomological Section, Lorquin, Nat. Hist. Club. Address Mr. Geo. B. Pearson, manager, 812 Stevenson Ave., Pasadena, Calif.

Japanese and Formosan Butterflies will be exchanged by S. Satake, 425 Nakashibuya, Tokyo, Japan.

Wanted—To purchase living material of any species of the genus Apantesis.—Dr. E. T. Learned, Fall River, Mass.

Cynipidae, galls or the bred makers, desired, to determine or for exchange. Also want to buy a copy of Das Tierreich, XXIV, Cynipidae. Alfred C. Kinsey, Bloomington, Indiana.

Coleoptera—Common species of this region offered in exchange for Coleoptera from any part of the world. Correspondence invited. Basil E. Montgomery, Poseyville, Ind.

Wanted—I would like offers on surplus Lepidoptera of any pretty Kinds. Butterfly Box, 7 Bromfield St., Boston, Mass.

Exchange—Large collection of Coleoptera in 20, 9 x 13 inches, cork-lined cases, value $90.00, for Lepidoptera. What have you? Andrew McLennan, Whitehall, Michigan.

COLLECTING PARTNER WANTED

Writer wishes to communicate with Entomologist or experienced collector of Lepidoptera and Mammals: his purpose being to obtain a partner for a proposed collecting trip of indefinite length in British Guiana—expenses, also proceeds of sale of any collections sold, to be equally divided. If results satisfactory, intend to follow collecting as vocation.

Am acquainted with British Guiana.
Address E. G. BLUNDELL,
Island Lake, Via W. Selkirk and Norway House, Manitoba, Canada

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DIPTERA

798.—**Alexander** (C. P.).—New or little known crane flies from Japan (Tipulidae). (Trans., **46**, 1-26, 1920)..... .40

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